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10/529,242	03/25/2005	Stephen Christopher Neil Brown	05040	6148

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EXAMINER	
EMPIE, NATHAN H	
ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/529,242	BROWN ET AL.	
	Examiner	Art Unit	
	NATHAN H. EMPIE	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2008 and 07 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29,31-33 and 46-51* is/are pending in the application.

4a) Of the above claim(s) *51* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29, 31-33, and 46-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Examiner acknowledges receipt of 11/26/08 amendment to the claims which was entered into the file. Claims 29, 31-33, and 46-51 are currently pending.

Election/Restrictions

Newly submitted claim 51 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

The inventions are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process, such as for selectively exposing a photoresist in a photolithographic process.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 51 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 29, 32, 33, 46, and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over '762 in view of Neiheisel (US patent 5,736,709, hereafter '709) and Kinoshita et al (US patent 6,300,594 B1; hereafter '594)

'762 teaches a method of removing a portion of a non-metallic surface, such as concrete (12) (Abstract, Col 5 line 57 –Col 6 line 8 Fig 1),

the method comprising providing a beam of laser light (14) (Fig 1);

irradiating a location of the surface (12) with the laser light (14) (Fig 1);

'762 further teaches the surface portion is removed by the effects of thermal shock (col 2 line 57 – col 3 line16)

'762 does not explicitly teach directing the beam through the central aperture of mask of hollow cylindrical form having a single central aperture therethrough such that the mask blocks a peripheral part of the beam of laser light and thereby removes a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated. '709 teaches a method of removing a portion of a surface (oxide layer from a metallic surface, abstract, col 2 line 65- col 3 line 5), comprising providing a beam of laser light (Fig 2 (54), (56), col 6, lines 37-67), and irradiating a location of the surface (38) with the laser light ((Fig 5-8) col 11, lines 24-27). Further '709 teaches wherein a mask means ((68)/(60)) is mounted and covers a peripheral part of the beam of laser light so as to remove a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated (Fig 3, conversion of profile 58 to 64, low power density is removed, and some col 10 lines 47-67, further, any peripheral portion of laser beam wider than entry to portion 60 would be removed). '709 further teaches that such a mask will yield uniform spatial power distribution across the focused beam, which enables a minimum surface power density throughout the impinging the beam to remove material (col 3 lines 1 – 67). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated the masking means

taught by '709 into the method of '762 to generate uniform spatial power distribution across the beam, enabling a more controllable material removal process.

'709 further teaches wherein the beam impinges upon the mask which is a cylindrical optical fiber, such as a step-index optical fiber (see, for example, col 10 lines 62 – 64, Fig 3). But '762 in view of '709 does not explicitly teach wherein the optical fiber mask is of hollow cylindrical form having a single central aperture. '594 teaches a method for machining a surface by impingement with a YAG laser (see, for example, abstract). '594 similarly incorporates a optical fiber (201) to make uniform the energy distribution on the cross section of the laser light, to reduce dimension variability (see, for example, col 12 lines 31 – 38). '594 teaches wherein the optical fiber is a step index optical fiber, or alternatively a hollow optical fiber could predictably perform the desired function (see, for example, col 12 lines 31 – 51). '594 has taught that hollow optical fibers are well in the art, and that both step index optical fibers and hollow optical fibers can predictably perform the function of uniformly distributing the energy of a laser beam, and as '709 has taught step-index optical fibers to perform the function of uniformly distributing the energy of a laser beam. Because both '594 and '762 in view of '709 teach methods for uniformly distributing the energy of a laser beam, it would have been obvious to one of ordinary skill in the art to substitute one method (namely incorporating a hollow optical fiber as the optical fiber) for the other to achieve the predictable result of uniformly distributing the energy of a laser beam.

Claim 32: '762 in view of '709 and '594 teaches the method of removing a portion of a surface according to claim 29 (above) wherein '709 and '594 further teaches the

mask is a reflective mask (step index optical fiber / hollow optical fiber), wherein light incident on the mask is reflected (multiple internal reflections) by the mask (see, for example, col 10, lines 47-67 of '709).

Claim 33: '762 in view of '709 and '594 teaches the method of removing a portion of a surface according to claim 32 (above) wherein '709 further teaches the reflection redirects low power density laser light to another low power density portion of the laser beam to create an additional high power density portion of the laser beam (Fig 3, conversion of profile 58 to 64, col 10 lines 47-67).

Claims 46, 48-50: The only difference between claims (29, and 32-33) and (46, 48-50) respectfully is the substitution of "a concrete surface" for "a natural stone surface". '762 in view of '709 and '594 teach the rejection to claims 29, and 32-33 (above), and '762 further teaches that its present invention may be applied not only to concrete, but also to other materials such as stone and sandstone (col 5 lines 31 – 38).

Claims 29, 31, 46, 47, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over '762 in view of Ngoi et al. (US patent 6,285,002, hereafter '002).

Claim 29: '762 teaches a method of removing a portion of a concrete surface (12) (Abstract, Col 5 line 57 –Col 6 line 8 Fig 1),

the method comprising providing a beam of laser light (14) (Fig 1);

irradiating a location of the surface (12) with the laser light (14) (Fig 1);

'762 further teaches the surface portion is removed by the effects of thermal shock (col 2 line 57 – col 3 line16)

'762 does not explicitly teach directing the beam through the central aperture of mask of hollow cylindrical form having a single central aperture therethrough such that the mask blocks a peripheral part of the beam of laser light and thereby removes a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated. '002 teaches a mask means (circular opening / diaphragm (5), see, for example, Fig 1, col 4 lines 29 - 31) is used to remove a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated (col 5 lines 32-39). '002 teaches a laser micro machining method where the incorporation of a diaphragm enhances the beam quality by eliminating the peripheral portion of the laser beam (col 5 lines 32-39). Since '762 teaches a method of laser machining a surface, it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated the diaphragm of '002 into the method described by '762, to enhance the resulting laser beam quality. In regards to the limitations that the mask is of hollow cylindrical form having a single aperture, the examiner asserts that '002 has taught the mask possesses "a (singular) circular opening", as the mask must possess some finite thickness, this circular opening would possess a dimension of height perpendicular to the circular plane, demonstrating a cylindrical form.

Claim 31: '762 in view of '002 teaches the method of removing a portion of a concrete surface according to claim 29 (above) wherein '002 further teaches the shadow mask absorbs substantially all of that portion of the laser beam that is below the threshold power density (see, for example, col 5 lines 32-40).

Claims 46, 47, and 50: The only difference between claims (29, and 31) and (46, 47 and 50) respectfully is the substitution of "a concrete surface" for "a natural stone surface". '762 in view of '002 teach the rejection to claims 29, 31 (above), and '762 further teaches that its present invention may be applied not only to concrete, but also to other materials such as stone and sandstone (col 5 lines 31 – 38).

Claims 29, 31-33, and 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over '762 in view of Dunsky et al (US patent 6,433,301, hereafter '301).

Claim 29: '762 teaches a method of removing a portion of a concrete surface (12) (Abstract, Col 5 line 57 –Col 6 line 8 Fig 1),

the method comprising providing a beam of laser light (14) (Fig 1);

irradiating a location of the surface (12) with the laser light (14) (Fig 1);

'762 further teaches the surface portion is removed by the effects of thermal shock (col 2 line 57 – col 3 line16)

'762 does not explicitly teach directing the beam through the central aperture of mask of hollow cylindrical form having a single central aperture therethrough such that the mask blocks a peripheral part of the beam of laser light and thereby removes a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated. '301 teaches a mask means (mask with circular aperture (98), see, for example, Fig 4, col 8 lines 5-19) is used to remove a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated (see, for example, Fig 5C, col

8 lines 5-19). '301 teaches a laser micro machining method where the incorporation of a the mask enhances the beam quality by eliminating the peripheral portion of the laser beam, enhancing quality , speed, and robustness of laser machining (see, for example, col 3 lines 60 - 65, col 8 lines 5-19). Since '762 teaches a method of laser machining a surface, it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated the mask of '301 into the method described by '762, to enhance the resulting laser beam quality. In regards to the limitations that the mask is of hollow cylindrical form having a single aperture, the examiner asserts that '301 has taught the mask possesses "a (singular) circular aperture" (see, for example, col 8 line 9), as the mask must possess some finite thickness, this circular opening would possess a dimension of height perpendicular to the circular plane, demonstrating a cylindrical form.

Claim 31: '762 in view of '301 teaches the method of removing a portion of a concrete surface according to claim 29 (above) wherein '301 further teaches the shadow mask absorbs substantially all of that portion of the laser beam that is below the threshold power density (see, for example, col 8 lines 5 – 19, wherein the mask is absorptive).

Claim 32: '762 in view of '301 teaches the method of removing a portion of a surface according to claim 29 (above) wherein '301 further teaches the mask is a reflective mask which reflects light incident thereon light (see, for example, col 8 lines 5 – 19, wherein the mask is taught to be reflective).

Claim 33: '762 in view of '301 teaches the method of removing a portion of a surface according to claim 32 (above) wherein the reflective mask of '301 would further inherently redirect low power density laser light to another low power density portion of the laser beam to create an additional high power density portion of the laser beam (See, for example, Fig 5C, 6D, the beam energy exiting the reflective mask possesses a uniform energy distribution, therefore any low power density portions of the beam that were reflected in the direction of the beam must have been redirected with other low power density portions to generate such a uniform distribution.

Claims 46-50: The only difference between claims (29, 31-33) and (46- 50) respectfully is the substitution of "a concrete surface" for "a natural stone surface". '762 in view of '301 teach the rejection to claims 29, 31-33 (above), and '762 further teaches that its present invention may be applied not only to concrete, but also to other materials such as stone and sandstone (col 5 lines 31 – 38).

Response to Arguments

Applicant's arguments, see pg 7-8, filed 10/7/08, with respect to the 35 USC 103 rejections of Li in view of Khoobehi have been fully considered and are persuasive. The examiner agrees that Khoobehi does not explicitly teach a mask possessing the newly amended limitation of a single central hollow cylindrical mask, and as such the 35 USC 103 (a) rejections of claims 29, 31-3, 35, and 46-50 over Li et al in view of Khoobehi et al have been withdrawn. However, upon further consideration, a new ground(s) of

rejection is made to claims 29, 31-3, 35, and 46-50 over Li in view of Dunsky ('301) (as described above).

Applicant's remaining arguments filed 10/7/08 have been fully considered but they are not persuasive.

With respect to the 35 USC rejections over Li in view of Neiheisel, the applicant's arguments that the references do not teach the newly added limitations are unconvincing in view of newly-cited Kinoshita ('594), as discussed above.

With respect to applicant's arguments made that Ngoi et al fails to a hollow cylindrical mask (pg 10 lines 13-15), the examiner asserts that Ngoi has taught the mask possesses "a circular opening",(which would meet the singular limitation), and as the mask must possess some finite thickness, this circular opening would possess a dimension of height perpendicular to the circular plane, having a cylindrical form.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN H. EMPIE whose telephone number is (571)270-1886. The examiner can normally be reached on M-F, 7:00- 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. H. E./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792